

Lab 16 - Gatekeepers

CCNA Voice Lab 16

Gatekeepers

Lab Objective:

The objective of this lab exercise is for you to learn and understand how to implement H.323 gatekeeper functionality in Cisco IOS voice gateways

Lab Purpose:

Gatekeepers are optional components in an H.323 network. If implemented, gatekeepers may be considered the most important component of the H.323 network and it is mandatory that all endpoints use their services. Endpoints communicate with the gatekeeper via the RAS protocol

Lab Difficulty:

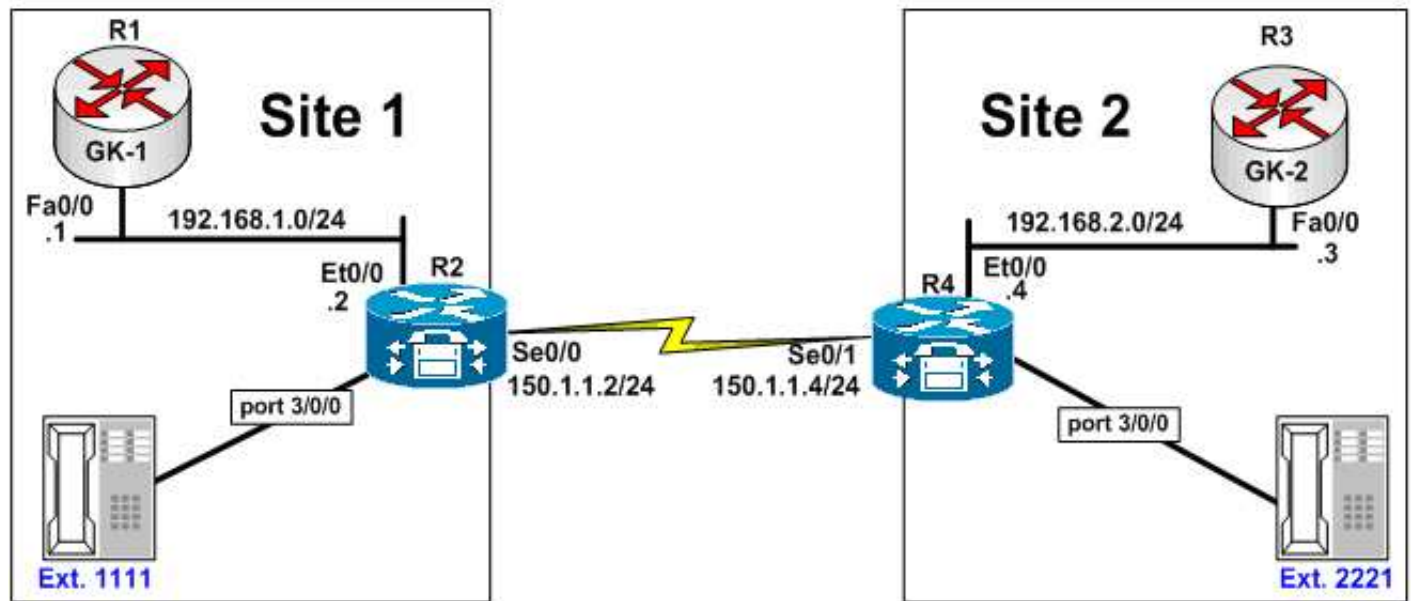
This lab has a difficulty rating of 8/10

Readiness Assessment:

When ready for your exam, you should be able to complete this lab in no more than 10 minutes

Lab Topology:

Please use the following topology to complete this lab exercise:



Lab 16 Configuration Tasks

Task 1:

Configure the hostnames and IP addresses on R1, R2, R3 and R4 as illustrated in the diagram. Configure R4 to provide clocking to R2. Configure the clock rate on R4 as 800Kbps

Task 2:

Configure the LAN connection between R1 and R2 using the IP addresses in the diagram

Task 3:

Configure the LAN connection between R3 and R4 using the IP addresses in the diagram

Task 4:

Configure IP routing between R1, R2, R3, and R4 using an IGP of your choice

Task 5:

Configure POTS dial peers for the connected phones on R2 and R4 as illustrated in the diagram. Also configure a single VoIP dial peer on both R2 and R4. This VoIP dial peer will use the H.323 gatekeeper. Use any dial peer numbers you want

Task 6:

Configure H.323 gatekeeper functionality on R1. Configure one local zone named R2-ZONE and a remote zone named R4-ZONE. R2 will register to the R2-ZONE and the R4-ZONE should point to R3. Configure the zone prefixes for both of these zones but also configure the gatekeeper for dynamic prefix registration

Task 7:

Configure H.323 gatekeeper functionality on R3. Configure one local zone named R4-ZONE and a remote zone named R2-ZONE. R4 will register to the R4-ZONE and the R2-ZONE should point to R1. Configure the zone prefixes for both of these zones but also configure the gatekeeper for dynamic prefix registration

Task 8:

Configure R2 and R4 to register to their respective gatekeeper. The H.323 ID of R2 should be configured as R2-GW and the H.323 ID of R4 should be configured as R4-GW. Both routers should be configured to register using Multicast. Both R2 and R4 voice gateways should be configured for dynamic prefix registration

Task 9:

Verify your configuration

Lab 16 Configuration and Verification

Task 1:

```
R2(config)#interface Serial0/0  
R2(config-if)#description .Connected To R4 Serial 0/1.  
R2(config-if)#ip address 150.1.1.2 255.255.255.0
```

```
R4(config)#interface Serial0/1  
R4(config-if)#description .Connected To R2 Serial 0/0  
R4(config-if)#ip address 150.1.1.4 255.255.255.0  
R4(config-if)#clock rate 800000
```

Verify connectivity by performing a simple ping between the two routers

```
R2#ping 150.1.1.4
```

Type escape sequence to abort.

Sending 5, 100-byte ICMP Echos to 150.1.1.4, timeout is 2 seconds:
!!!!

Success rate is 100 percent (5/5), round-trip min/avg/max = 4/4/4 ms

```
R4#ping 150.1.1.2
```

Type escape sequence to abort.

Sending 5, 100-byte ICMP Echos to 150.1.1.2, timeout is 2 seconds:
!!!!

Success rate is 100 percent (5/5), round-trip min/avg/max = 4/4/8 ms

Task 2:

```
R1(config)#int f0/0
R1(config-if)#description .Connected To Switch 1 FastEthernet 0/2.
R1(config-if)#ip address 192.168.1.1 255.255.255.0
R1(config-if)#exit
```

```
R2(config)#int e0/0
R2(config-if)#description .Connected To Switch 1 FastEthernet 0/3.
R2(config-if)#ip address 192.168.1.2 255.255.255.0
R2(config-if)#exit
```

Verify connectivity by performing a simple ping between the two routers

R1#ping 192.168.1.2

Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 192.168.1.2, timeout is 2 seconds:
!!!!
Success rate is 100 percent (5/5), round-trip min/avg/max = 1/2/4 ms

R2#ping 192.168.1.1

Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 192.168.1.1, timeout is 2 seconds:
!!!!
Success rate is 100 percent (5/5), round-trip min/avg/max = 1/2/4 ms

NOTE: If you have a LAN switch between R1 and R2, the switch will need to be configured to allow the LAN interfaces to communicate with each other. This is performed as follows:

```
!
hostname Sw1
!
vlan 12
 name R1_R2_VLAN
!
interface FastEthernet0/2
 description 'Connected To R1 FastEthernet 0/0'
 switchport mode access
 switchport access vlan 12
 no shutdown
!
interface FastEthernet0/3
 description 'Connected To R2 FastEthernet 0/0'
 switchport mode access
 switchport access vlan 12
 no shutdown
```

Task 3:

```
R4(config)#int e0/0
R4(config-if)#description .Connected To Switch 2 FastEthernet 0/3.
R4(config-if)#ip address 192.168.2.4 255.255.255.0
R4(config-if)#exit
```

```
R3(config)#int f0/0
R3(config-if)#description .Connected To Switch 2 FastEthernet 0/2.
R3(config-if)# ip address 192.168.2.3 255.255.255.0
R3(config-if)#exit
```

Verify connectivity by performing a simple ping between the two routers

R3#ping 192.168.2.4

Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 192.168.2.4, timeout is 2 seconds:
!!!!
Success rate is 100 percent (5/5), round-trip min/avg/max = 1/3/4 ms

R4#**ping 192.168.2.3**

Type escape sequence to abort.

Sending 5, 100-byte ICMP Echos to 192.168.2.3, timeout is 2 seconds:

!!!!

Success rate is 100 percent (5/5), round-trip min/avg/max = 1/2/4 ms

NOTE: If you have a LAN switch between R1 and R2, the switch will need to be configured to allow the LAN interfaces to communicate with each other. This is performed as follows:

```
!  
hostname S2  
!  
vlan 34  
 name R3_R4_VLAN  
!  
interface FastEthernet0/2  
 description 'Connected To R3 FastEthernet 0/0'  
 switchport mode access  
 switchport access vlan 34  
 no shutdown  
!  
interface FastEthernet0/3  
 description 'Connected To R4 FastEthernet 0/0'  
 switchport mode access  
 switchport access vlan 34  
 no shutdown
```

Task 4:

R1#**show ip eigrp neighbors**

IP-EIGRP neighbors for process 100

H	Address	Interface (sec)	Hold Uptime (ms)	SRTT Cnt	RTO Num	Q	Seq
0	192.168.1.2	Fa0/0	11 02:24:05	407	5000	0	25

R2#**show ip eigrp neighbors**

IP-EIGRP neighbors for process 100

H	Address	Interface (sec)	Hold Uptime (ms)	SRTT Cnt	RTO Num	Q	Seq
1	192.168.1.1	Et0/0	12 02:23:54	3	200	0	15
0	150.1.1.4	Se0/0	12 02:25:01	110	660	0	37

R3#**show ip eigrp neighbors**

IP-EIGRP neighbors for process 100

H	Address	Interface (sec)	Hold Uptime (ms)	SRTT Cnt	RTO Num	Q	Seq
0	192.168.2.4	Fa0/0	11 00:02:46	8	300	0	36

R4#**show ip eigrp neighbors**

IP-EIGRP neighbors for process 100

H	Address	Interface (sec)	Hold Uptime (ms)	SRTT Cnt	RTO Num	Q	Seq
1	192.168.2.3	Et0/0	14 00:02:32	4	200	0	13
0	150.1.1.2	Se0/1	10 02:24:34	5	200	0	26

Task 5:

R2(config)#**dial-peer voice 1 pots**

R2(config-dial-peer)#**destination-pattern 1111**

R2(config-dial-peer)#**port 3/0/0**

R2(config-dial-peer)#**exit**

R2(config)#**dial-peer voice 2 voip**

R2(config-dial-peer)#**destination-pattern .T**

R2(config-dial-peer)#**session target ras**

```
R2(config-dial-peer)#exit
```

```
R4(config)#dial-peer voice 1 pots
R4(config-dial-peer)#destination-pattern 2221
R4(config-dial-peer)#port 3/0/0
R4(config-dial-peer)#exit
R4(config)#dial-peer voice 2 voip
R4(config-dial-peer)#destination-pattern .T
R4(config-dial-peer)#session target ras
R4(config-dial-peer)#exit
```

Task 6:

```
R1(config)#gatekeeper
R1(config-gk)#zone local R2-ZONE howtonetwork.net 192.168.1.1
R1(config-gk)#zone remote R4-ZONE howtonetwork.net 192.168.2.3
R1(config-gk)#zone prefix R2-ZONE 1...
R1(config-gk)#zone prefix R4-ZONE 2...
R1(config-gk)#rrq dynamic-prefixes-accept
R1(config-gk)#no shutdown
R1(config-gk)#exit
```

Task 7:

```
R3(config)#gatekeeper
R3(config-gk)#zone local R4-ZONE howtonetwork.net 192.168.2.3
R3(config-gk)#zone remote R2-ZONE howtonetwork.net 192.168.1.1
R3(config-gk)#zone prefix R4-ZONE 2...
R3(config-gk)#zone prefix R2-ZONE 1...
R3(config-gk)#rrq dynamic-prefixes-accept
R3(config-gk)#no shutdown
R3(config-gk)#exit
```

Task 8:

```
R2(config)#int e0/0
R2(config-if)#h323-gateway voip interface
R2(config-if)#h323-gateway voip id R2-ZONE multicast
R2(config-if)#h323-gateway voip h323-id R2-GW
R2(config-if)#exit
R2(config)#voice service voip
R2(conf-voi-serv)#h323
R2(conf-serv-h323)#ras rrq dynamic prefixes
R2(conf-serv-h323)#exit
R2(conf-voi-serv)#exit
R2(config)#gateway
R2(config-gateway)#exit
```

```
R4(config)#int e0/0
R4(config-if)#h323-gateway voip interface
R4(config-if)#h323-gateway voip id R4-ZONE multicast
R4(config-if)#h323-gateway voip h323-id R4-GW
R4(config-if)#exit
R4(config)#voice service voip
R4(conf-voi-serv)#h323
R4(conf-serv-h323)#ras rrq dynamic prefixes
R4(conf-serv-h323)#exit
R4(conf-voi-serv)#exit
R4(config)#gateway
R4(config-gateway)#exit
```

Task 9:

The first validation task is to ensure that H.323 endpoints are registered to the gatekeeper:

```
R1#show gatekeeper endpoints
```

GATEKEEPER ENDPOINT REGISTRATION

```
=====
CallSignalAddr Port RASSignalAddr Port Zone Name      Type  Flags
-----
192.168.1.2    1720 192.168.1.2    51467 R2-ZONE      VOIP-GW
H323-ID: R2-GW
E164-ID: 1111
Voice Capacity Max.= Avail.= Current.= 0
Total number of active registrations = 1
```

R3#**show gatekeeper endpoints**

GATEKEEPER ENDPOINT REGISTRATION

```
=====
CallSignalAddr Port RASSignalAddr Port Zone Name      Type  Flags
-----
192.168.2.4    1720 192.168.2.4    51534 R4-ZONE      VOIP-GW
E164-ID: 2221
H323-ID: R4-GW
Voice Capacity Max.= Avail.= Current.= 0
Total number of active registrations = 1
```

Next, verify zone prefix configuration and dynamic registration on the gatekeepers:

R1#**show gatekeeper zone prefix all**

ZONE PREFIX TABLE

```
=====
GK-NAME      E164-PREFIX      Dynamic GW-priority
-----
R2-ZONE      1111*           R2-GW /5
R2-ZONE      1...
R4-ZONE      2...
```

R3#**show gatekeeper zone prefix all**

ZONE PREFIX TABLE

```
=====
GK-NAME      E164-PREFIX      Dynamic GW-priority
-----
R2-ZONE      1...
R4-ZONE      2221*           R4-GW /5
R4-ZONE      2...
```

The same information can also be validated on the gateways:

R2#**show h323 gateway prefixes**

```
GK Supports Additive RRQ      : True
GW Additive RRQ Support Enabled : True
Pattern Database Status       : Active
```

```
Destination      Active
Pattern          Status    Dial-Peers
=====
1111*          ADD ACKNOWLEDGED    1
```

R4#**show h323 gateway prefixes**

```
GK Supports Additive RRQ      : True
GW Additive RRQ Support Enabled : True
Pattern Database Status       : Active
```

```
Destination      Active
Pattern          Status    Dial-Peers
=====
```

2221* ADD ACKNOWLEDGED 1

Next, test your configuration by placing a call between extension 1111 and extension 2222:

R1#show gatekeeper calls

Total number of active calls = 1.

GATEKEEPER CALL INFO

=====

LocalCallID	Age(secs)	BW
1-17041	8	16(Kbps)
Endpt(s): Alias	E.164Addr	
src EP: R2-GW	1111	
CallSignalAddr	Port	RASSignalAddr Port
192.168.1.2	1720	192.168.1.2 51467
Endpt(s): Alias	E.164Addr	
dst EP: 2221		
CallSignalAddr	Port	RASSignalAddr Port
192.168.2.4	1720	192.168.2.4 1720

R3#show gatekeeper calls

Total number of active calls = 1.

GATEKEEPER CALL INFO

=====

LocalCallID	Age(secs)	BW
1-17041	26	16(Kbps)
Endpt(s): Alias	E.164Addr	
src EP: R2-GW	1111	
Endpt(s): Alias	E.164Addr	
dst EP: R4-GW	2221	
CallSignalAddr	Port	RASSignalAddr Port
192.168.2.4	1720	192.168.2.4 51534

The same can be verified on the H.323 gateways:

R2#show call active voice compact

<callID> A/O FAX T<sec> Codec type Peer Address IP R<ip>:<udp>

Total call-legs: 2

3	ANS	T73	g729r8	TELE	P1111	
4	ORG	T73	g729r8	VOIP	P2221	150.1.1.4:18114

R4#show call active voice compact

<callID> A/O FAX T<sec> Codec type Peer Address IP R<ip>:<udp>

Total call-legs: 2

3	ANS	T53	g729r8	VOIP	P1111	150.1.1.2:16550
4	ORG	T53	g729r8	TELE	P2221	

Final Relevant Configuration R1:

R1#show running-config

Building configuration...

Current configuration : 1797 bytes

!

version 12.4

service timestamps debug datetime msec

service timestamps log datetime msec

no service password-encryption

!

hostname R1

!

!

!

!

interface FastEthernet0/0

description .Connected To Switch 1 FastEthernet 0/2.

ip address 192.168.1.1 255.255.255.0

```

duplex auto
speed auto
!
router eigrp 100
network 0.0.0.0
no auto-summary
!
!
!
!
gatekeeper
zone local R2-ZONE howtonetwork.net 192.168.1.1
zone remote R4-ZONE howtonetwork.net 192.168.2.3 1719
zone prefix R2-ZONE 1...
zone prefix R4-ZONE 2...
rrq dynamic-prefixes-accept
no shutdown

```

Final Relevant Configuration R2:

R2#**show running-config**

Building configuration...

Current configuration : 1552 bytes

```

!
version 12.4
service timestamps debug datetime msec
service timestamps log datetime msec
no service password-encryption
!
hostname R2
!
!
!
!
voice service voip
h323
  ras rrq dynamic prefixes
!
!
!
!
interface Ethernet0/0
description .Connected To Switch 1 FastEthernet 0/3.
ip address 192.168.1.2 255.255.255.0
full-duplex
h323-gateway voip interface
h323-gateway voip id R2-ZONE multicast
h323-gateway voip h323-id R2-GW
!
interface Serial0/0
description .Connected To R4 Serial 0/1.
ip address 150.1.1.2 255.255.255.0
no fair-queue
!
!
router eigrp 100
network 0.0.0.0
no auto-summary
!
!
!
!
voice-port 3/0/0
!
voice-port 3/0/1

```



```

voice-port 3/0/1
!
voice-port 3/1/0
!
voice-port 3/1/1
!
!
!
!
dial-peer voice 1 pots
 destination-pattern 1111
 port 3/0/0
!
dial-peer voice 2 voip
 destination-pattern .T
 session target ras
!
gateway

```

Final Relevant Configuration R3:

R3#**show running-config**

Building configuration...

```

Current configuration : 1222 bytes
!
version 12.4
service timestamps debug datetime msec
service timestamps log datetime msec
no service password-encryption
!
hostname R3
!
!
!
!
interface FastEthernet0/0
 description .Connected To Switch 2 FastEthernet 0/2.
 ip address 192.168.2.3 255.255.255.0
!
!
router eigrp 100
 network 0.0.0.0
 no auto-summary
!
!
!
!
control-plane
!
!
!
!
gatekeeper
 zone local R4-ZONE howtonetwork.net 192.168.2.3
 zone remote R2-ZONE howtonetwork.net 192.168.1.1 1719
 zone prefix R2-ZONE 1...
 zone prefix R4-ZONE 2...
 rrq dynamic-prefixes-accept
 no shutdown

```

Final Relevant Configuration R4:

R4#**show running-config**

Building configuration...

Current configuration : 1581 bytes

Current configuration: 12002 bytes

```
!  
version 12.4  
service timestamps debug datetime msec  
service timestamps log datetime msec  
no service password-encryption  
!  
hostname R4  
!  
!  
!  
!  
voice service voip  
h323  
    ras rrq dynamic prefixes  
!  
!  
!  
!  
interface Ethernet0/0  
description .Connected To Switch 2 FastEthernet 0/3.  
ip address 192.168.2.4 255.255.255.0  
full-duplex  
h323-gateway voip interface  
h323-gateway voip id R4-ZONE multicast  
h323-gateway voip h323-id R4-GW  
!  
!  
interface Serial0/1  
description .Connected To R2 Serial 0/0  
ip address 150.1.1.4 255.255.255.0  
clock rate 800000  
!  
router eigrp 100  
network 0.0.0.0  
no auto-summary  
!  
!  
!  
!  
voice-port 3/0/0  
!  
voice-port 3/0/1  
!  
voice-port 3/1/0  
!  
voice-port 3/1/1  
!  
!  
!  
!  
dial-peer voice 1 pots  
destination-pattern 2221  
port 3/0/0  
!  
dial-peer voice 2 voip  
destination-pattern .T  
session target ras  
!  
gateway
```



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